

Curriculum Vita

Clara K. Fenger, DVM, PhD, Dipl. ACVIM

A. **Title:** Clinical Pharmacology and Internal Medicine Consultant, sole proprietor
Equine Integrated Medicine, PLC

B. **Address:**

Office and Home:
4904 Ironworks Rd.
Georgetown, KY 403245
502-867-7574
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E-mail address: drfenger@hotmail.com

C. **Personal Information:**

Date of Birth:	5-14-62	Marital Status:	Married to John L. Langemeier, MS
Place of Birth:	Honolulu, HI	Ethnicity:	Danish-Korean

D. **EDUCATION:**

1993 - 1995	University of Kentucky	PhD, Veterinary Science
	Major Professor:	Molecular Parasitology
	David Granstrom	

Dissertation: "Application of small ribosomal subunit RNA gene sequence of *Sarcocystis neurona* toward delineation of a definitive host and serologic studies."

1989 - 1992	The Ohio State University	MS, Exercise Physiology
	Major Professor:	
	Kenneth H. McKeever	

Thesis: "Determinants of hemoglobin saturation during incremental exercise in horses."

	Equine Internal Medicine Residency	Completed ACVIM certification requirements in May 1992.
1984 - 1988	University of California, Davis	DVM
1980 - 1984	University of California, Davis	BS Summa Cum Laude, Animal Physiology

Educational Awards and Honors;

- Don Kahn Outstanding Graduate Student Presentation, CRWAD, November 1994
- Geoffrey C. Hughes Fellowship, March 1993
- Beecham Research Abstract Award, ACVIM, May 1992
- California Thoroughbred Breeders Association Scholarship, 1987
- Foal Team Leader, neonatal intensive care unit, VMTH, UC Davis, 1987
- Secretary, Veterinary Medical Class of 88, 1984 to 1985
- Departmental Citation, Department of Animal Physiology, 1984
- Member Undergraduate Dean's Council, 1984
- Member Phi Kappa Phi honor society, 1983 and 1984
- Member and founding president of Davis chapter of Phi Sigma, honor society, 1984
- Founding president of undergraduate Animal Physiology Club, 1983 and 1984

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E. Professional Positions:

June 2019 - Present	Adjunct Professor	Texas A&M Animal Science Department
April 2016 – Present	Senior Compliance Manager	Animal Healthcare Products and Packaging
November 2017 - Present	Preventative Controls Qualified Individual (PCQI)	Animal Healthcare Products and Packaging
August 1993 - Present	Veterinary Internal Medicine, Pharmaceuticals and Diagnostics Industry Consultant	Equine Integrated Medicine, PLC
January 1993 – Present	Private practitioner	Equine Integrated Medicine, PLC
January 1996 - March 1996	Post-doctoral fellow, Parasitology	University of Kentucky
August 1994 - August 1997	Moderator, Equine Forum, Network of Animal Health	American Veterinary Medical Association
February 1993-October 2008	Part-time State Racing Veterinarian	Kentucky Racing Commission
Jan 1993 - December 1995	Graduate Research Assistant in Parasitology	University of Kentucky Veterinary Science
Sept 1992 -Jan 1993	Research Assistant in Equine Exercise Physiology	The Ohio State University
July 1989 -June 1992	Resident, Equine Medicine Graduate Research Assistant in Equine Exercise Physiology	The Ohio State University
June 1988 -May 1989	Associate Veterinarian	Bayview Equine Clinic

F. Board Positions:

2014 – Present:	Secretary, North American Association of Racetrack Veterinarians
2015 – Present:	Secretary, Equine Health and Welfare Alliance
2018 – Present:	Member, USTA Medication Committee

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G. Expert testimony:

Qualified as an expert in Physiology, Equine Exercise Physiology, Equine Internal Medicine, Equine Racetrack Practice and/or Equine Clinical Pharmacology

Type of Proceedings	Jurisdiction	
Criminal	Federal Middle District Court in Pennsylvania	Misbranding
	State Court, Bowling Green, Kentucky	Animal Negligence
Civil	California	Sales dispute
	Texas	Malpractice
Administrative	New Mexico	Racing Medication
	Oklahoma	Racing Medication
	Maryland	Racing Medication
	Kentucky	Racing Medication
	Pennsylvania	Racing Medication
	Delaware	Racing Medication
	New Jersey	Racing Medication
	Massachusetts	Racing Medication
	Maine	Racing Medication
	Ohio	Racing Medication
	Alberta, CANADA	Racing Medication
	Ontario, CANADA	Racing Medication
FEI	Barcelona, SPAIN	FEI Medication
	Ontario, CANADA	FEI Medication
	Abu Dhabi, UAE	FEI Medication

H. Research Interests and Consulting Projects:

2018 – present	Mitochondrial differences between racing disciplines as determined by High Resolution Respirometry	Texas A&M University, Dr. Sarah White, PI
2017 - present	Investigation of the transfer between red blood cells and plasma of dantrolene and its metabolite, and implication for post-race testing	Equine Health and Welfare Alliance, Frank Marcum President
2016 – present	The underlying cause of Recurrent Exertional Rhabdomyolysis	Michigan State University, Stephanie Valberg, PI
2016 - present	Pharmacokinetics of a high no-effect dose of mepivacaine, and implications for plasma and urinary thresholds	Equine Health and Welfare Alliance, Frank Marcum President
2016 - present	A field investigation of betamethasone plasma concentrations six and ten days after joint injections in racing Thoroughbreds, Standardbreds and Quarter Horses	Equine Health and Welfare Alliance, Frank Marcum President
2015 - 2016	Clinical Investigator: Performed GCP clinical trial for efficacy portion of FDA registration of injectable Dipyrone (Zimeta®)	KindredBio Amity Allman, Project Manager
2015 - 2017	A field investigation of dexamethasone plasma concentrations at 48 and 72 hours post injection in racing Thoroughbreds, Standardbreds and Quarter Horses	Equine Health and Welfare Alliance, Frank Marcum President

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2015 - 2017	A field investigation of methylprednisolone plasma concentrations six days after joint injections in racing Thoroughbreds, Standardbreds and Quarter Horses	Equine Health and Welfare Alliance, Frank Marcum President
2013 – 2016	Evaluation of UVC radiation for disinfection of animal holding facilities, including utility for Ascarid eggs and coccidia, inactivation of drugs	American Air and Water, Hilton Head, SC
2013 – 2016	Use of abdominal ultrasound to identify ascarid infection in horses.	Zoetis, Martin Nielsen, PI
1999 – present	Animal supplement consultant and technical support: duties include recommendations on supplement formulations, GMP testing and manufacturing consultation, technical support	Animal Healthcare Products and Packaging, Inc. Winchester, KY Mark Wolf, President
2011 – 2015	Animal supplement consultant and clinical researcher: duties include Clinical Trial design, budgeting and implementation, Clinical Investigator	Saskatoon Colostrum Co, Saskatoon, CAN Deborah Haines, Dir of Research
2002 – 2007	Animal Pharmaceutical consultant and clinical researcher: duties included Clinical Trial design, budgeting and implementation, meeting with FDA for clinical trial design review, Clinical Investigator	Aspen Biopharma, Inc. Castlerock, CO Mark Colgin, Chief Scientist
1998 – 2007	Animal Pharmaceutical consultant and clinical researcher: duties included Clinical Trial design, budgeting and implementation, Clinical Investigator	Idexx Pharmaceuticals, Inc. Greensboro, NC Doug Hepler, VP of RD
1996 – 2001	Animal Pharmaceutical and Diagnostics consultant and technical support: duties included oversight of EPM diagnostic testing, including adherence to GLP, QA, and technical support	Neogen Corporation Lexington, KY Dwight Schroedter, Chief Scientist
1998	Clinical Investigator: Performed GCP clinical trial for efficacy portion of FDA registration of praziquantel/ivermectin combination	Merial Ltd. John Holste, Associate Director
1996 – 1999	Animal Pharmaceutical Consultant and Inventor: designed and patented novel animal drug combination for treatment of EPM, designed clinical trial to meet FDA requirements for registration, met with FDA	Mortar and Pestle Pharmaceuticals, Inc Des Moines, IA Charm Russell, President

I. Regulatory Experience:
Food and Drug Administration

1996	Study Director, NADA Pyrimethamine/sulfadiazine combination	Mortar and Pestle Pharmaceuticals, Inc Des Moines, IA Charm Russell, President
1998	Clinical Investigator, Praziquantel/Ivermectin combination	Merial Ltd. John Holste, Associate Director
2015	Clinical Investigator, pyrexia study	Kindred BioScience, Burlingame, CA

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2017	Clinical Investigator, pyrexia study	Christine Towey, Sr. Manager Clinical Operations Kindred BioScience, Burlingame, CA Ashley Zellers, Senior Clinical Research Associate
2018-present	Preventative Controls Qualified Individual	Animal Healthcare Products and Packaging, Inc Winchester, KY Mark Wolf, President
Racing Regulatory 1993 – 2008	Regulatory Veterinarian	Kentucky Horse Racing Commission Lexington, KY

J. Teaching Experience:

Graduate-Professional (1989 – 1992)	Applied Veterinary Medicine Equine Medicine and Surgery	The Ohio State University Columbus, OH
(2019-present)	Clinical Neurology	Academy of Animal Sports Science
Undergraduate (2001 – 2017)	Eastern Medicine and Therapy Topics in Equine Management	Midway University Midway, KY
Undergraduate (1993 – 1994)	Agriculture Disease Management Principles of Animal Disease Control	University of Kentucky Lexington, KY
Undergraduate (1982 – 1984)	Undergraduate Tutoring in Math, Physics, Biology	UC Davis Davis, CA

Continuing Education Programs: available on request**K. PUBLICATIONS:****Refereed Journals**

1. Guy CP, Latham CM, Owen RN, Fowler AL, Fenger CK, Riley RG, White-Springer SH. 2021. Weanling Thoroughbred mitochondrial profiles are related to race performance metrics. Journal of Equine Veterinary Science 100 doi: 10.1016/j.jevs.2021.103466.
2. Aldrich K, Velez-Irizarry D, Fenger C, Schott M, Valberg SJ. 2021. Pathways of calcium regulation, electron transport, and mitochondrial protein translation are molecular signatures of susceptibility to recurrent exertional rhabdomyolysis in Thoroughbred racehorses. PLOS One 16(2):e0244556. doi: 10.1371/journal.pone.0244556. eCollection 2021.
3. McKeever KH, Manso Filho HC, Rankins EM, Duchamp CS, Salah Y, Fenger CK, Duer WC, Malinowski K, Maylin GA. 2021. Clenbuterol plasma concentrations after therapeutic administration in fit Standardbred Horses: Threshold recommendations. Comparative Exercise Physiology, DOI: 10.3920/CEP200065.

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4. McClure S, Fenger C, Kersh K, Brown B, Maylin G, Duer W, Dirikolu L, Brewer K, Machin J, Tobin T. 2020. Dexamethasone serum concentrations after intravenous administration in racing horses during race training. Comparative Exercise Physiology, 17(3):263-272.
5. Machin J, Childers T, Kudrimoti S, Eisenberg R, Fenger C, Hartmann P, Maylin G, Shults T, Tobin T. 2020. Synthesis and characterization of barbarin, a possible source of unexplained aminorex identifications in forensic science. Drug Testing and Analysis, 12(10):1477-1482, DOI: 10.1002/(ISSN)1942-7611.
6. McKeever KH, Malinowski K, Fenger CK, Duer WC, Maylin GA. 2020. Evaluation of Cobalt as a Performance Enhancing Drug (PED) in Race Horses. Comparative Exercise Physiology, 16(4):243-252, DOI: 10.3920/CEP200001.
7. Machin J, Brewer K, Catignani M, Shults TF, Fenger CK, Maylin GA, Tobin T. 2019. An interim screening limit of detection for naproxen in equine plasma: a review and analysis. Comparative Exercise Physiology, 16(2):153-160.
8. Maylin GA, Fenger CK, Machin J, Kudrimoti S, Eisenberg R, Green JD, Tobin T. 2019. Aminorex identified in horse urine following consumption of *Barbarea vulgaris*; A preliminary report. Irish Veterinary Journal, 72:15. DOI: 10.1186/s13620-019-0153-5.
9. Latham C, Fenger CK, White S. 2019. Rapid Communication: Differential skeletal muscle mitochondrial characteristics of weanling racing-bred horses. Journal of Animal Science, 97(8):3193-3198.
10. Valberg SJ, Soave K, Williams ZJ, Perumbakkam S, Schott M, Finno CJ, Petersen JL, Fenger CK, Autry JM, Thomas DD. 2019. Coding sequences of sarcoplasmic reticulum calcium ATPase regulatory peptides and expression of calcium regulatory genes in recurrent exertional rhabdomyolysis. Journal of Veterinary Internal Medicine, 33(2):933-941.
11. Machin J, Duer W, Maylin G, Fenger C, Wilson D, Ivey M, Berthold B, Allison S, Tobin T. 2019. Variability in plasma concentrations of methylprednisolone 6 days after intrasynovial injection of methylprednisolone acetate in racing horses: a field study. Equine Veterinary Journal, 51(3):343-348, doi: 10.1111/evj.13003.
12. Brewer K, Shults TF, Machin J, Kudrimoti S, Eisenberg RL, Hartman P, Wang C, Fenger C, Beaumier P, Tobin T. 2016. A cluster of trace-concentration methamphetamine identifications in racehorses associated with a methamphetamine-contaminated horse trailer: A report and analysis. Canadian Veterinary Journal. Aug;57(8):860-4.
13. Fenger CK, Tobin T, Casey PJ, Roualdes EA, Langemeier JL, Cowles R, Haines DM. 2016. Enhanced Bovine Colostrum Supplementation Shortens the Duration of Respiratory Disease in Thoroughbred Yearlings. Journal of Equine Veterinary Science. 42:77-81.
14. Brewer K, Maylin GA, Fenger CK, Tobin T. 2016. Cobalt Use and Regulation in Horseracing: A Review. Comparative Exercise Physiology. 12(1):1-10.
15. Nielsen MK, Donoghue EM, Stephens ML, Stowe MJ, Donecker JM, Fenger CK. 2015. An ultrasonographic scoring method for transabdominal monitoring of ascarid burdens in foals. Equine Veterinary Journal. 18 Aug 2015. DOI: 10.1111/evj.12478
16. Fenger CK, Tobin T, Casey PJ, Roualdes EA, Langemeier JL, Haines DM. 2014. Bovine colostrum supplementation optimises earnings, performance and recovery in racing Thoroughbreds. Comparative Exercise Physiology. 10(4):233-238.

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17. Fenger, CK, Tobin T, Casey PJ, Langemeier JL, Haines DM. 2014. Bovine Colostrum Supplementation Does Not Influence Serum Insulin-like Growth Factor-1 in Horses in Race Training. Journal of Equine Veterinary Science. 34(8):1025-1027.
18. Rehbein S, Holste JE, Doucet MY, Fenger CK, Paul AJ, Reinemeyer CR, Smith LL, Yoon S, Marley SE. 2003. Field efficacy of ivermectin plus praziquantel oral paste against naturally acquired gastrointestinal nematodes and cestodes of horses in North America and Europe. Veterinary Therapeutics. 4(3):220-7.
19. Fenger CK. 2001. Limitations to veterinary applications of new technologies in treatments and diagnostics. Vet Clin North Am Equine Pract. 17(2):389-94.
20. Fenger CK, McKeever KH, Hinchcliff KW, Kohn CW. 2000. Determinants of oxygen delivery and hemoglobin saturation during incremental exercise in horses. Am J Vet Res. 61(10):1325-32.
21. Fenger, CK. 1998. Treatment of Equine protozoal myeloencephalitis. Compendium on Continuing Education for the Practicing Veterinarian. 20:1154 - 1157.
22. Fenger, CK. 1997. Equine protozoal myeloencephalitis. Compendium on Continuing Education for the Practicing Veterinarian. 19:513.
23. Fenger, CK, DE Granstrom, AA Gajadhar, NM Williams, SA McCrillis, S Stamper, JL Langemeier, JP Dubey. 1997. Experimental induction of Equine Protozoal Myeloencephalitis in horses using *Sarcocystis* sp. sporocysts from the opossum (*Didelphis virginiana*). Veterinary Parasitology 68: 199-206.
24. Fenger, CK, DE Granstrom, JL Langemeier, S Stamper. 1997. An epizootic of equine protozoal myeloencephalitis (EPM) on a Thoroughbred farm. J Am Vet Med Assoc, 210:923-927.
25. Rees, WA, JD Harkins, WE Woods, RA Blouin, M Lu, CK Fenger, RE Holland, TM Chambers, T Tobin. 1997. Amantidine and equine Influenza: pharmacology, pharmacokinetics and neurological effects in the horse. Equine Vet J. 29(2):104-10.
26. Rees, WA, JD Harkins, WE Woods, RA Blouin, M Lu, CK Fenger, RE Holland, T Tobin, TM Chambers. 1996. Chemotherapy for equine influenza: Overview of the pharmacology and side effects of amantidine and rimantidine in the horse. Proc 11th Int Conf Racing Analysts and Veterinarians, 355-357.
27. Fenger, CK, DE Granstrom, JL Langemeier, J Patterson, S Stamper, M Donahue, AA Gajadhar, J Martenink, Z Xiaomin, and JP Dubey. 1995. Identification of opossums (*Didelphis virginiana*) as the putative definitive host of *Sarcocystis neurona*. Journal of Parasitology, 81(6): 916-919.
28. Fenger, CK, DE Granstrom, JL Langemeier, A Gajadhar, G Cothran, RR Tramontin, JP Dubey and S Stamper. 1994. Phylogenetic relationship of *Sarcocystis neurona* to other members of the family Sarcocystidae based on small subunit ribosomal RNA gene sequence. Journal of Parasitology, 80(6):966-975.
29. Fenger, CK, J Bertone, J Merryman and D Biller. 1993. Generalized osteonecrosis in a horse. J Am Vet Med Assoc, 202(3): 621-623.
30. Fenger, CK, G Hoffsis and G Kociba. 1992. Idiopathic immune-mediated hemolytic anemia in an Angus heifer. J Am Vet Med Assoc, 201(1): 97-99.

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31. Fenger, CK and CW Kohn. 1992. Tracheal obstruction caused by tracheal luminal collapse secondary to streptococcus pneumonia in a horse. J Am Vet Med Assoc 200(11): 1698-1701.

Other Publications

- Fenger CK, Brewer K, Sacopulos P, Machin J, Tobin T. Horseman's Journal "Lidocaine positives in Arkansas." Summer 2020
- Fenger, CK, Basler, D, Tobin, T, Brewer, K. Horseman's Journal. "An examination of the many factors that can contribute to breakdowns." Spring, 2020.
- Brewer, K, Fenger, CK, Hamelback, E, Sacopulos, P. Horseman's Journal. "Shining a light on Scopolamine and environmental contamination." Winter, 2019.
- Brewer, K, Fenger, CK, Machin J, Tobin T. Horseman's Journal. "The push to administer Lasix at 24 hours: A look at what the science says." Winter, 2019.
- Brewer, K, Fenger, CK, Tobin T. Horseman's Journal. "The truth about medication, veterinary care and breakdowns." Fall, 2019.
- Brewer, K, Fenger, CK, Tobin T. Horseman's Journal. "The benefits of Lasix for exercise-induced pulmonary hemorrhage: 50 years of science and clinical experience." Summer, 2019.
- Fenger, CK, Brewer, K, Duer, W, Tobin T. Horseman's Journal. "Feed, forage and bedding: What is being called a positive." Spring, 2019.
- Fenger, CK, Tobin T, Catignani M, Shults T. Horseman's Journal. "Hitting the Threshold of Common Sense: The time for screening limits to guard against environmental transfer is now." Winter, 2018.
- Fenger, CK, Machin J, Tobin T. Horseman's Journal. "Tackling the Lameness Problem: A collaborative study on joint injections between the National HBPA and Veterinarians is bearing knowledge." Winter, 2018.
- Fenger, CK, Selway S, Tobin T. Horseman's Journal. "Lasix Lessons Learned: Science confirms what American horsemen knew 50 years ago." Fall 2018.
- Fenger, CK, Sacopulos, P, Tobin T. Horseman's Journal. "Trace-level identifications are not positives: the scientifically correct and public relations appropriate approach to medication regulation." Summer 2018.
- Fenger, CK. Horseman's Journal. "Regenerative Medicine: Getting Horses back on track." Summer 2018.
- Fenger, CK. Horseman's Journal. "Focus on the Fetlock: NAARV Symposium panel examines developments in treating fetlock injuries." Spring 2018.
- Fenger, CK, Catignani M, Machin J, Tobin T. Horseman's Journal. "An in-depth look at stall contamination." Winter 2017.
- Fenger, CK. Horseman's Journal. "Understanding EHV-1 and how to prevent it." Winter 2017.

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- Fenger, CK, Tobin T. Horseman's Journal. "Medication Migration: The Charles Town Naproxen experience and why it matters to all racing jurisdictions." Fall 2017.
- Fenger, CK, Tobin T, Ecabert P. Horseman's Journal. "No Lasix Racing: Good idea or failed experiment." Summer 2017.
- Fenger, CK, Boulmetis T, Tobin T. Horseman's Journal. "Out In the Cold: Ingredients in over-the-counter cold medicines can wreak havoc on a trainer's livelihood and an owner's prized racehorse." Spring 2017.
- Fenger, CK, Boulmetis T, Brewer K, Tobin T. Horseman's Journal. "The Lowdown on Our of Competition Testing: What the RMTC isn't telling us about its proposed regulation." Winter 2016.
- Fenger, CK, Boulmetis T, Brewer K, Stirling K, Tobin T. Horseman's Journal. "Methamphetamine: A substance of emerging environmental concern for horsemen." Fall 2016.
- Fenger, CK. Horseman's Journal. "Xylazine: Redistribution of Reputation. How a meeting in Baltimore still affects medication regulations years later." Summer 2016.
- Fenger, CK, Sacopulos PL. Horseman's Journal. "Tying Up in Racehorses: Navigating the complicated medication waters." Spring 2016.
- Fenger, CK, Barker S, Soring K, Shalgos L, Tobin T. Horseman's Journal. "Trace Environmental Substances Showing up as Post-Race "Positives" : What every horseman needs to know about being wrongly accused.?" Winter 2015.
- Fenger, CK. Horseman's Journal. "Thyroid Hormone Supplementation: Performance enabling or enhancing?" Summer 2015.
- Fenger, CK and PL Sacapulos. Horseman's Journal. "What is Cobalt?" Spring 2015.
- Fenger, CK, Roberts AM, and Casey J. Horseman's Journal. "Wandering Withdrawal times and the RMTC: Time for the RMTC to get days." Fall 2014
- Fenger CK. Horseman's Journal. "To Salix or not to Salix." Summer 2014.
- Fenger, CK. Large Animal Veterinarian, "EPM," March-April 1996.
- Fenger, CK. The Horse, "Differential Diagnosis of Neurologic Disease in the Horse," June 1995.
- Fenger, CK. The Horse, "DNA Testing for *Sarcocystis neurona*," April 1995, "Neurologic Diseases of Horses," June 1995.
- Fenger, CK. Ohio Thoroughbred Breeders Association Magazine, "Colic," July 1989, "Vaccinations in the Horse", January 1992.
- Fenger, CK. Monthly column, California Horse Review, 1988 and 1989. "Potomac Horse Fever," "Tying Up Syndrome in Horses," "Colic," "Pigeon Fever," "Veterinary Facts About Buying a Horse," "Lyme Disease," and "Foaling."

L. Book Chapters

- Fenger, CK. 2004. "Antiprotozoal Drugs," In Equine Clinical Pharmacology, Ed. Joe Bertone and Linda Horspool. WB Saunders.

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- Fenger, CK. 1997. "Equine Protozoal Myeloencephalitis," In Current Veterinary Therapy IV, Ed. N. E. Robinson. WB Saunders.
- Fenger, CK. "Diseases of Calcium Metabolism," "Neonatology, perinatology and pediatrics," and "Treatment of Ileus" In Equine Internal Medicine, Ed. Stephen M. Reed and Warwick Bayly.
- Robertson, JT and CK Fenger. 1991. "Diseases of the Nasal Passages." In Current Veterinary Therapy in Equine Medicine III, Ed. NE. Robinson. WB Saunders.

M. ABSTRACTS available on request

N. RESEARCH IN PROGRESS:

- (1) Valberg S, Velez-Irizarry D, Sordillo L, Gandy J, Pagan J, Fenger CK. Innovative treatment for Recurrent Exertional Rhabdomyolysis. Sponsor: Grayson Foundation.
- (2) Keegan K, Fenger, CK, Brown B, McClure S, Tyrrell L: Use of inertial sensor gait analysis for determining race horses at risk of injury. Sponsor: Equine Health and Welfare Alliance and Equinosis, LLC.
- (3) Tobin, T, Fenger, CK: Clinical Field study of therapeutic drug thresholds in horse racing. Sponsor: Equine Health and Welfare Alliance

O. PATENTS HELD:

- (1) PCR diagnostics for *S. neurona* in horses
- (2) Pyrimethamine/sulfadiazine for the treatment of *S. neurona* infection in horses.

O. ADDITIONAL CERTIFICATES HELD:

Basic Analytical Chemistry
Medical Review Officer Training

P. PROFESSIONAL ASSOCIATIONS:

2017 – Present: American Academy of Veterinary Pharmacology and Therapeutics

2015 – Present: North American Association of Racetrack Veterinarians

2010 – Present: International Veterinary Chiropractic Association

1994 - 2017: American Association of Equine Practitioners

1994 - Present: American Association of Veterinary Parasitologists

1992 - Present: Diplomate, American College of Veterinary Internal Medicine

1992 - Present: Kentucky Association of Equine Practitioners

1988 - Present: American Veterinary Medical Association

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P. CORPORATE AFFILIATIONS:

1997 - Present:	Senior Compliance Manager, Animal Healthcare Products and Packaging, Inc. (Winchester, KY)
2014 – Present:	Scientific Advisory Board, American Air and Water, (Hilton Head, SC)
2004 - 2009:	Scientific Advisory Board, Aspen Bio Inc. (Castlerock, CO)
2001:	Animal Care and Use Committee, PTRL, Inc (Richmond, KY)